



## An Analysis of the Cultural Landscape and Settlement Pattern of the Kashafrud Basin (Mashhad Plain) in the Iron Age

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### Abstract

The Khorasan region, especially the Kashafrud basin, has culturally retained a strategic position by virtue of its location between three major cultural spheres of southwestern Central Asia, the Central Plateau of Iran, and northeastern Iran. The Iron Age still remains a mainly unknown period in this region. In northeast Iran, particularly in the Greater Khorasan, the period is characterized by cultural attributes utterly different from those of the other parts of the Iranian Plateau. Coeval archaeological evidence from Khorasan shows affinities with the Yaz and Dahistan cultures of Central Asia. The major topics considered in this study are: the distribution pattern and major influential factors in the formation of the Iron Age settlements in the Kashafrud basin (Mashhad Plain), the nature of Iron Age cultural material in the region, and the characteristics shared between the contemporary settlements in Mashhad and the adjacent regions. Further major research objectives include proposing a comparative chronology, analyzing the regional cultural landscape, and specifying the Iron Age settlement patterns in the region. Thus, attempts have been made to answer the research questions through ArcGIS maps, analysis of surface ceramics, and the landscape archaeology approach. The results indicate the impressive role of environmental factors, especially the Kashafrud River as the leading regional resource, in the advent of Iron Age settlements. Moreover, the regional material culture exhibits strong affinities with the Iron Age culture of "Yaz" in Central Asia, and indicates relations and population movements between the different regions that were under the influence of this culture.

**Keywords:** Khorasan, Iron Age, Central Asia, Yaz Culture, Settlement Pattern, Kashafrud.

**Article Type:** Research Article

### Introduction

The available information about changes in prehistoric Khorasan is incomplete. In 1974–5, French scholars A. Ariaie and C. Thibault surveyed the banks of the Kashafrud and collected 60 stone choppers from the early Paleolithic period in the Bagh-Baghrou area (Ariai & Thibault 1977). Therefore, the region has always attracted the attention of researchers (Biglari 2015: 16-24; Amirlou, 1986: 16). Despite the importance of the region, no serious archaeological activity has covered its prehistoric period, especially the Iron Age. It is obvious that the strategic position of the Khorasan region as a link between the Central

Asian and Iranian cultures, on the one hand, and the Kashafrud river with its various tributaries, on the other, provided a conducive milieu for the formation of prehistoric human settlements. Apart from these, environmental factors also played a crucial part. Man has always attempted to adapt to the environment for their survival. With expanding his scope of knowledge, human aims at ruling over the environment and establishing civilizations (Motarjem & Almasi 2014). Archaeological studies to perceive the human relations with his environment in antiquity called for the study of settlement patterns. This kind of study focuses on the entire regional sites instead of a single



site. The major focus in settlement pattern is on the biogeography and the relation of human in settlement location and living in a geographical area (Kowalewski, 2008: 227). The interaction between human and environment is significant because they always influence each other. Culture, which is regarded as a characteristic of human societies, is the result of this interaction (Motarjem & Almasi, 2014). In order to identify the distribution pattern and effective factors in the formation of the Iron Age settlements in the Kashafrud basin (Mashhad Plain), this research attempts to introduce the cultural elements and components the regional Iron Age settlements shared with coeval adjacent sites. Using GIS, a pattern for the distribution of the Iron Age settlements in the Kashafrud region was extracted. Then the cultural components were taken into account, before the regional cultural landscape in the Iron Age was analyzed based on intra-regional and trans-regional relations. It should be noted that the ongoing research could provide a basis for further studies in the Khorasan cultural realm.

### Research Background

Serious scholarship on prehistoric sites in Mashhad County is simply restricted to two surface survey projects by an Iranian-French joint team (Ariai & Thibault 1977), and M. Bakhtiari in 1998 (Labaf Khaniki, 2012: 137-148). A series of inconsistent, desultory publications on the regional prehistory are also available (Amirlou 1986; Habibi *et al*, 2015; Jamialahmadi *et al*, 2008; Biglari 2015). Two unpublished theses on the region completed in the University of Neyshabur based on the materials kept in the archives of Khorasan Razavi Cultural Heritage, Tourism and Handicrafts Directorate, round up the list (Davari 2016; Mazari Moghadam 2016). Investigations in eastern Atrak have produced some cultural material from the Iron Age that exhibit strong correspondences with the cultures of Yaz<sup>1</sup> and Dahistan (Ricciardi, 1980: 58-59; Kohl, *et*

<sup>1</sup>The Yaz culture was an early Iron Age culture of Central Asia and emerges after the late Bronze Age. Yaz is the main Iron Age site in the oasis of Margiana (Masson, 1986: 312). Material culture of Yaz divided into three phases in chronological approach (I-III). According to the latest chronology based on absolute dating, Yaz I emerged about 1500/1400 to 1000 BCE. (Lhuillier, 2013: 208), Yaz II from 1000 to 540 BCE. (Lecomte, 2013) and Yaz III probably spans from 550 to 330 BCE (Heussner & Boroffka, 2013: 182-184; Basafa and Davari, 2011). The Yaz culture is characterized by small settlements based on agriculture and handmade pottery with primitive geometric motifs (Bulawka, 2017).

*al*. 1982: 10). An expedition from the Metropolitan Museum reported materials from Iron Age/Yaz I after excavating at Settlement P in Neyshabour (Hiebert & Dyson 2002). Lack of information from the Iron Age of Khorasan continued until the excavation at Jeyran Tepe in 2012, which recovered finds similar to the Yaz culture and Dahistan (Vahdati 2016). The evidence from the Iron Age Yaz culture was identified in these following investigation: excavation at Ghara Cheshmeh in Neyshabour (Basafa 2014); investigations at Tape Tigh Mohreh in Neyshabour (Basafa 2017) and excavations at Se Tape (Basafa & Rezaei 2019) and Kohne Ghale (Basafa & Hedayati 2020).

### Research Methodology

This study uses a descriptive-analytical method and the Landscape Archaeology approach. At the first step, the data was gathered from the materials in the archives of the provincial Cultural Heritage Directorate before a dataset was prepared. Using maps extracted from ArcGIS to interpret the effective elements in the formation and distribution patterns of the Iron Age settlements, several factors such as elevation, terrain type (plain and highland), ground slope, distance from rivers, land use, extent, distance between settlements were examined. The reason behind selecting these factors is their relative constancy over the long time involved, i.e. from prehistory up to the present. Furthermore, in order to establish a comparative chronology and identify the cultural components of the Iron Age in the central Kashafrud basin (Mashhad plain), the surface potteries stored at the Great Museum of Khorasan were studied and compared.

### Theoretical Foundations

According to hydraulic theory, there are a number of major factors in the formation of settlements, such as irrigation of arable land, population growth and density in favorable areas (Shakouie, 1994: 142). Settlement pattern in human dwellings reflects the environmental features in the form of terrain, climate, vegetation, environment, access to water, soil and other natural sources which influence settlements (Saedi, 2016: 43-44). Eventually, what is perceived as Landscape Archaeology is composed of two fields: archaeology and geography. This approach to archaeology analyzes the past landscapes and places chosen by ancient people in the environment. In general, landscape

archaeology studies the human in a vast concept. Human and environment have mutual interactions (Green, 1997: 51), which is the main element in the formation of cultures and civilizations.

**Archaeological Finds**

The basin of Kashafrud and its tributaries constitute the study area concerned here. Reconnaissance surveys in the Kashafrud basin (Mashhad Plain) by Khorasan Razavi Cultural Heritage Directorate have recorded a total of 14 prehistoric settlements (Figure. 1; Table. 1). Judging from pottery evidence (Figures. 2-3; Table. 2), of these settlements four emerged for the first time in the Iron Age, and four were earlier, Late Bronze Age, sites that were reused in the Iron Age or their occupations persisted after the early Iron Age. These sites are the focus of the present study. Iron Age

settlements of the Mashhad plain chronologically split into two groups: the first includes those already established before the Iron Age (the mounds of Naderi, Dovin, Toup Derakht and Gash); and the second consists of sites that originated in the Iron Age (the mounds of Helali, Kiyouk, Sangar and Rostam Khan).

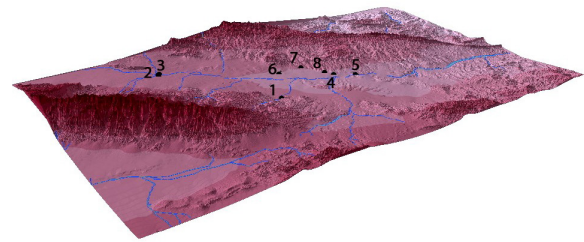


Figure. 1: Distribution of Iron Age settlements in the Mashhad plain

Table. 1: Specifications of Iron Age Settlements in the Mashhad plain

No.	Site	UTM		EMS	Width (m)	Cultural Materials		Periods						
		N	E			Pottery	other	Neolithic	Transition to Chalcolithic	Chalcolithic	Bronze Age	Iron Age		
												Yaz III	Yaz II	Yaz I
1	Tepe Nader Torogh A	593537	361051	1052	9000	*	*		*	*	*	*	*	*
2	Toup Derakht Tepe	363257	592104	1066	77000	*	*			*	*	*	*	
3	Dovin Tepe	363223	592046	1091	19000	*					*	*	*	*
4	Gash Tepe	361232	595921	860	4650	*					*	*	*	
5	Sangar Tepe	401360	762880	878	4067	*						*	*	
6	Khan Rostam Tepe	401710	761130	906	21190	*						*	*	
7	Koyuok Tepe	402335	755900	972	2477	*						*	*	
8	Helali Tepe			940	790	*						*		

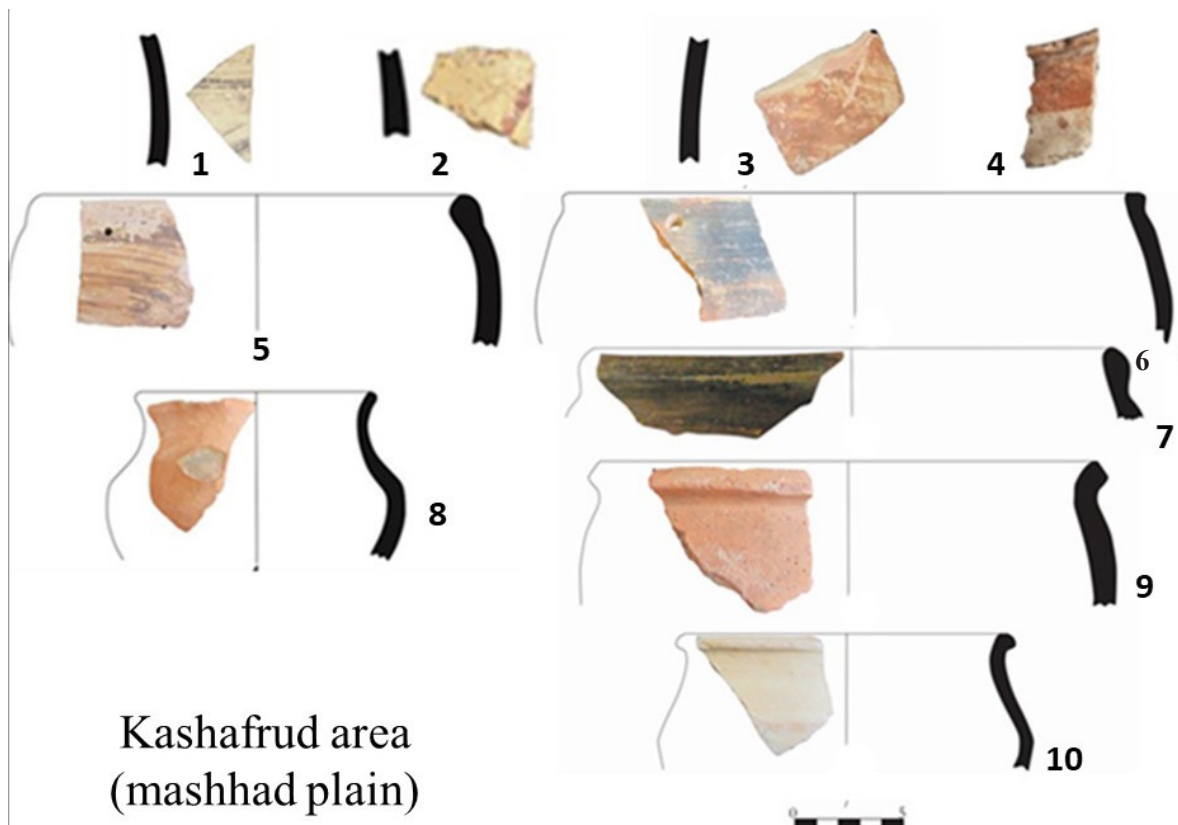


Figure 2: Yaz I pottery from the Mashhad plain

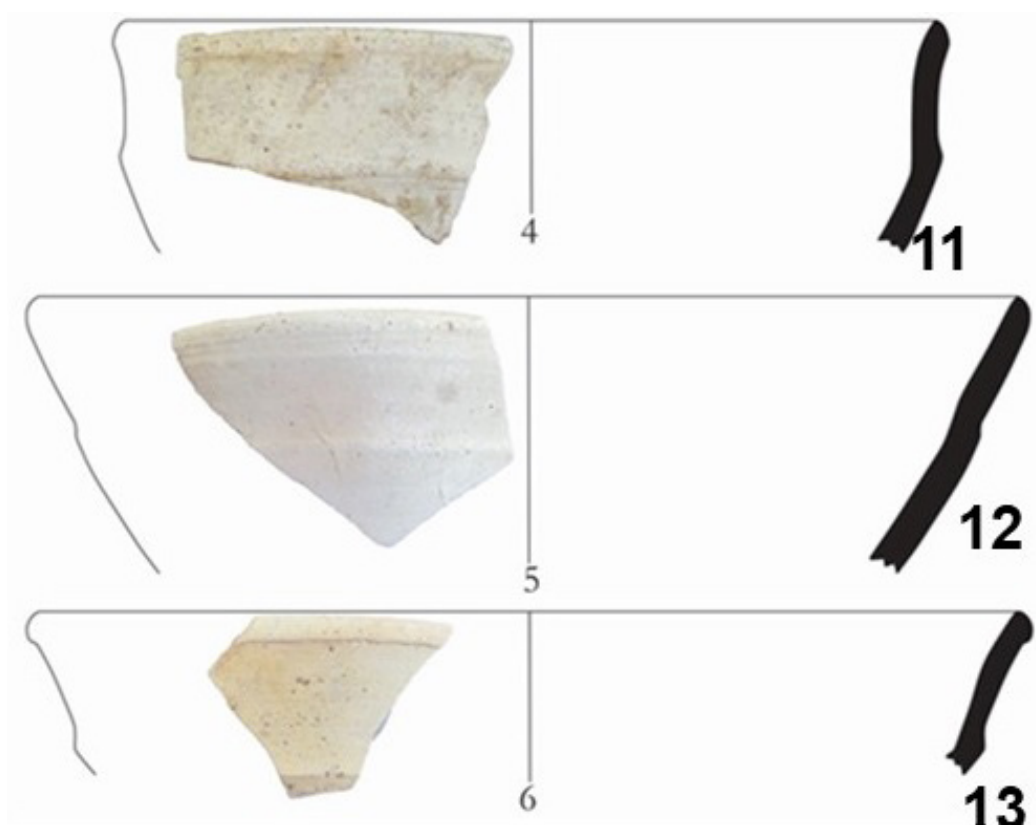


Figure 3: Yaz III pottery

Table 2: Specifications of the diagnostic Iron Age (Yaz) pottery from the Mashhad plain

Row	Type	Quality	Decoration	Place	Paste Color	Exterior Color	Interior Color	Technique	Temper	Firing	Site	Period (Yaz)
1	General	Medium	Band (Geometric) Gray	Outer	Buff	Buff	Buff	Wheel	Mineral	Well Fired	Dovin Tepe	I
2	General	Medium	Band Red	Outer	Buff	Buff	Buff	Hand	Mineral	Well Fired	Dovin Tepe	II & III
3	General	Medium	-	-	Buff	Red Slip	Buff	Wheel	Mineral	Well Fired	Koyuok Tepe	II & III
4	Rim	Medium	Band Dotted Red	Outer	Buff	Buff	Buff	Hand	Mineral	Well Fired	Naderi Tepe A	I
5	Cauldron	Medium	-	-	Buff	Red Slip	Buff	Wheel	Mineral	Well Fired	Dovin Tepe	II & III
6	Vase?	Medium	-	-	Red	Orange Slip	Red	Wheel	Mineral	Well Fired	Dovin Tepe	II & III
7	Cauldron	Medium	-	-	Red	Red & Gray Slip	Red	Wheel	Mineral	Well Fired	Naderi Tepe A	II & III
8	Closed Mouth Cauldron	Medium	-	-	Buff	Red Slip	Buff	Wheel	Mineral	Well Fired	Khan Rostam Tepe	II & III
9	Everted Rim Cauldron	Coarse	-	-	Red	Red	Red	Wheel	Mineral	Well Fired	Toup Derakht Tepe	II & III
10	Everted Rim Cauldron	Medium	-	-	Buff	Buff	Buff	Wheel	Mineral	Well Fired	Toup Derakht Tepe	II & III
11	Tulip Shaped Bowl	Fine	-	-	Buff	Buff	Buff	Wheel	Mineral	Well Fired	Naderi Tepe A	III
12	Tulip Shaped Bowl	Fine	-	-	Buff	Buff	Buff	Wheel	Mineral	Well Fired	Naderi Tepe A	III
13	Carinated Bowl	Fine	-	-	Buff	Buff	Buff	Wheel	Mineral	Well Fired	Khan Rostam Tepe	III

### Geographic Landscape - The Role of Environmental Factors in Distribution of Iron Age Settlements of the Kashafrud Basin (Mashhad Plain)

Strong correlation exists between precipitations, flora and fauna, and height above sea level in different regions. In this respect, the considered

sites fall into two classes: sites in elevations between 633–933 m (n = 5); and sites in elevations between 966–1300 m (n = 3) (Table 3).

The extent of the Iron Age settlements of this region varies by their archaeological sequence. Thus, settlements containing earlier deposits in their sequence are the most extended given the heightened



social complexities and urban transformations in the Bronze Age. The disturbed nature of the surface material as well as inconsistencies in their collection or submission by the survey teams excludes an analysis of the extents of the sites in individual periods based on their surface finds. Therefore, the extents recorded for the sites with earlier deposits cannot be generalized to the Iron Age sites, and only the four sites of Helali Tepe, Koyouk Tepe, Sangar Tepe and Rostam Khan Tepe that began to be occupied in the Iron Age reflect the real extent of the settlements of this period. Accordingly, regional settlements vary from 790 m2 to 77000 m2 in total area. Sangar Tepe was probably part of the focal point of the southeastern branch of the regional settlements in the plain in the Iron Age (Figure. 4; Table. 4).

Table. 3: Iron Age sites in the Mashhad plain by elevation

Row	Sites	Height above sea level (m)
1	Naderi Tepe	1052
2	Dowin Tepe	1091
3	Toup Derakht Tepe	1066
4	Sangar Tepe	878
5	Gash Tepe	860
6	Helaali Tepe	940
7	Koyouk Tepe	963
8	Rostam Khan Tepe	906

Table. 4: Iron Age sites in the Mashhad plain by extent

Row	Sites	Extent(m2)
1	Naderi Tepe	9000
2	Dowin Tepe	19000
3	Toup Derakht Tepe	77000
4	Sangar Tepe	4067
5	Gash Tepe	4650
6	Helaali Tepe	790
7	Koyouk Tepe	2477
8	Rostam Khan Tepe	130S- 163N

Plains and mountains are significant elements in studying the spatial distribution of ancient sites in different localities. The analysis of this spatial location could reveal some facts such as subsistence system, level of dependence to existing sources, and efforts made by local inhabitants to meet the biological needs. Human settlements are generally found in the two landscapes types of plain and mountain, which in turn slip into several subcategories of highland, hillside, foothill, and wide plain. Subsistence of prehistoric societies rested on two major factors: agriculture (contingent on plain and water) and pastoralism (contingent on elevation and grassland). The Iron Age settlements in the Mashhad plain are invariably located in the

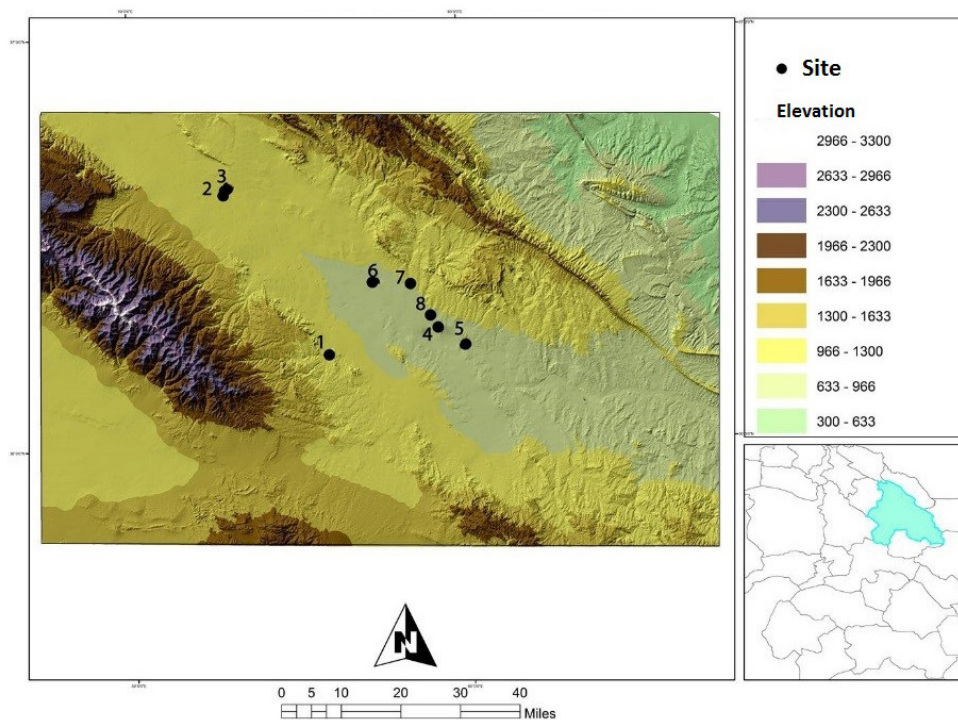


Figure. 4: Iron Age Settlements (Mashhad Plain) Distribution than Elevation

plains often next to rivers, a situation that place them among the settlements relying on agriculture. As no survey has yet covered the regional mountains, this observation cannot be applied to the entire region. Probably most of the concerned settlements were semi-seasonal and related to nomadism and pastoralism (Figure. 5).

human groups, who tended to build their settlements next to water resources. Access to these resources is a significant factor in the formation and distribution of settlements. Gaining an insight in to the fact that which sites lie near springs and permanent rivers and which are located on seasonal rivers is important in that it can reveal local settlement patterns. The Iron

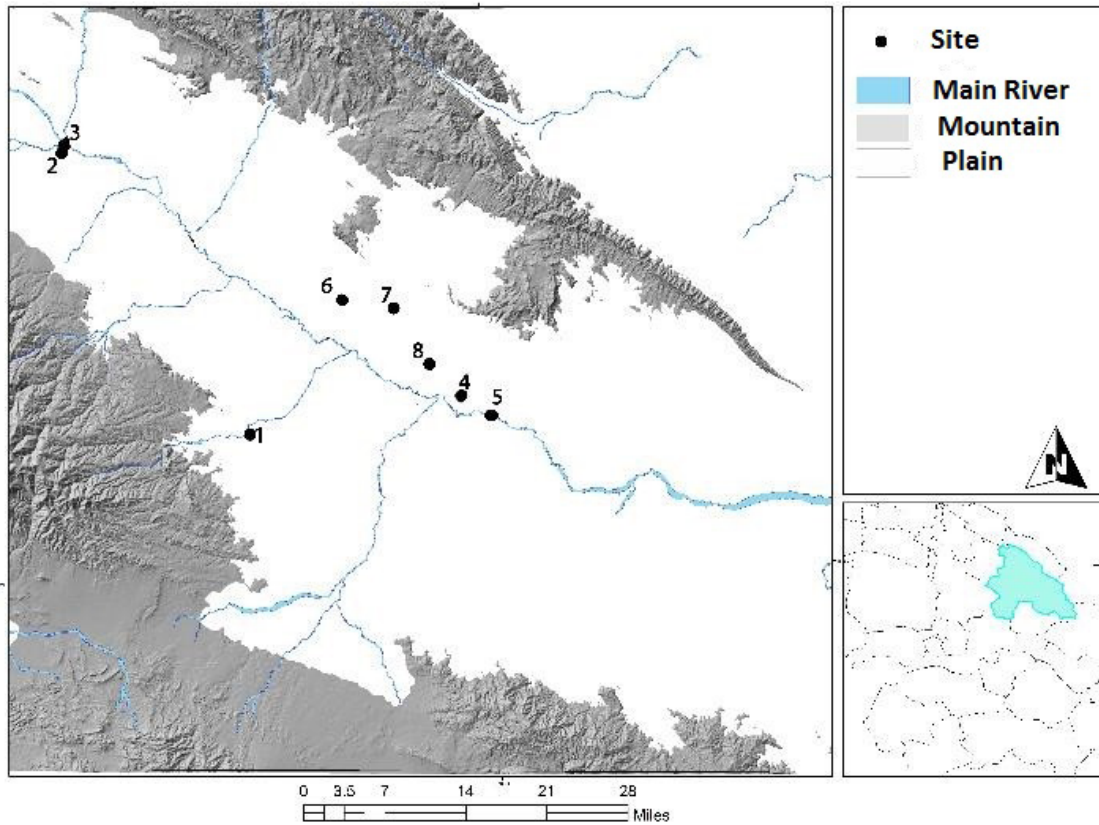


Figure. 5: Distribution of the Iron Age settlements in the Mashhad plain by landscape type

In order to understand the formation and relocation of the ancient sites as a result of the late Bronze Age and Iron Age developments, distribution of the settlements with respect to elevation and slope were examined. About 75% of the identified sites lie in a slope degree of 6, and 25% in slope degrees between 6–13 (Figure. 6). Since this range is the most suitable slope for agriculture, it will contribute to increased crop yield provided that other environmental and non-environmental conditions are suitable. It is worth mentioning that, with respect to the regions slope aspect, the Iron Age sites of the Mashhad plain orient towards south and southeast, which corresponds to the direction of the Kashafrud’s flow.

The need for water is a central factor in geographical distribution and settlement locating of

Age settlements of the Mashhad plain are adjacent to water resources, a fact that points to an intense dependence on this vital element. Seven sites are separated by less than 500 m from the main regional river, and only a single site lies farther from the latter (Figure. 7).

Arable lands possessed a particular allure for prehistoric communities. As seen in Figure. 8, the Iron Age settlements tend to lie in highlands. Indigenous knowledge of ancient people led them to choose arable lands and favorable environment for habitation. So, all of the Iron Age settlements across the plain are distributed in farmlands, a fact that has led to their destruction as a result of modern Mechanised agriculture (Figure. 8).

### Cultural Landscape

Archaeological studies in western half of Central Asia in the early 2<sup>nd</sup> millennium BCE have revealed the presence of two different cultures in the Iron Age: Dahistan in the region encompassing the Meshed-e Misrian plain, and Yaz in the area of the Murghab delta (Basafa, 2017: 4-5). Dahistan is in the eastern Caspian littoral in Turkmenistan. This culture is probably a part of ancient Hyrcania, and is stretched along the Gorgan plain to Mazandaran and Gilan (Lecomte, 2005: 461). The Dahistan culture has been identified in an alluvial plain (Mashhad-e Misrian), and the foremost feature of this plain is the advanced agriculture with different irrigation systems and channels (Askarov, 1992: 318). According to C14 determinations, the culture flourished from the second half of the 2<sup>nd</sup> millennium BCE to the 8<sup>th</sup>–9<sup>th</sup> centuries BCE (Kohl, 1984: 200) and a date between 1300–500 BCE has also been suggested for the culture (Lecomte, 2007: 102). The early Dahistan culture is characterized by a wheel-made pottery with polished gray surface, made in a fine paste in the forms of spouted vessels (pitchers), tripods, handled cups, strainers, and handled rectangular bowls (Askarov, 1992: 450). Northern Khorasan and such plains as Bojnourd and Esfarayen are influenced by this culture (Vahdati, 2015: 42), to which a date in 1650 BCE is suggested (Vahdati 2019).

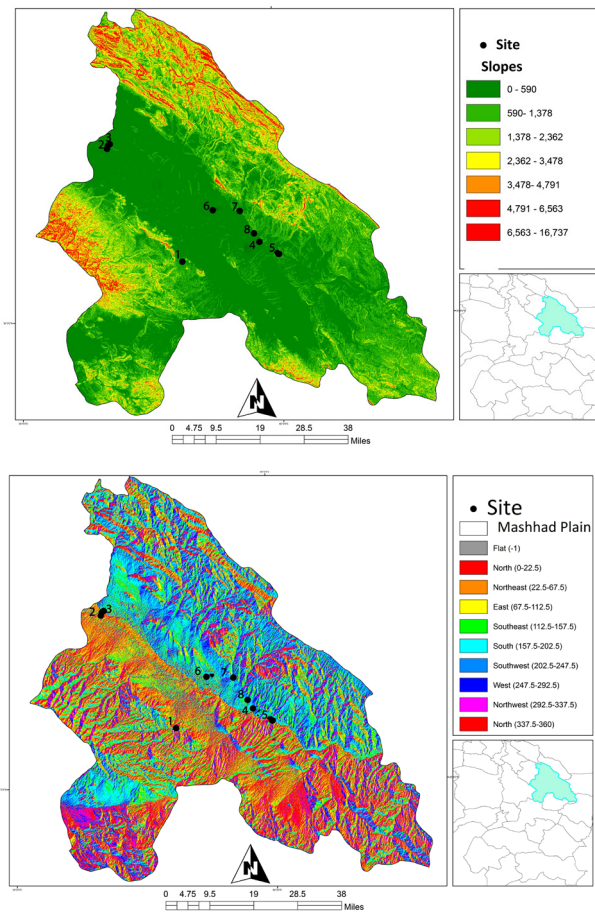


Figure 6: Distribution of the Iron Age settlements in the Mashhad Plain by slope and slope aspect

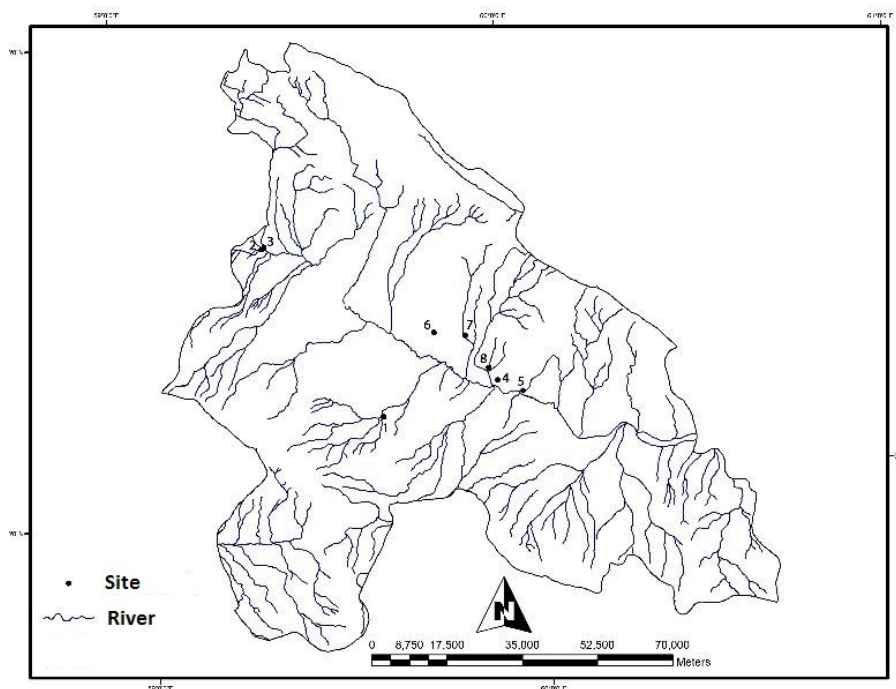


Figure 7: Distribution of the Iron Age settlements in the Mashhad plain by distance to water resources



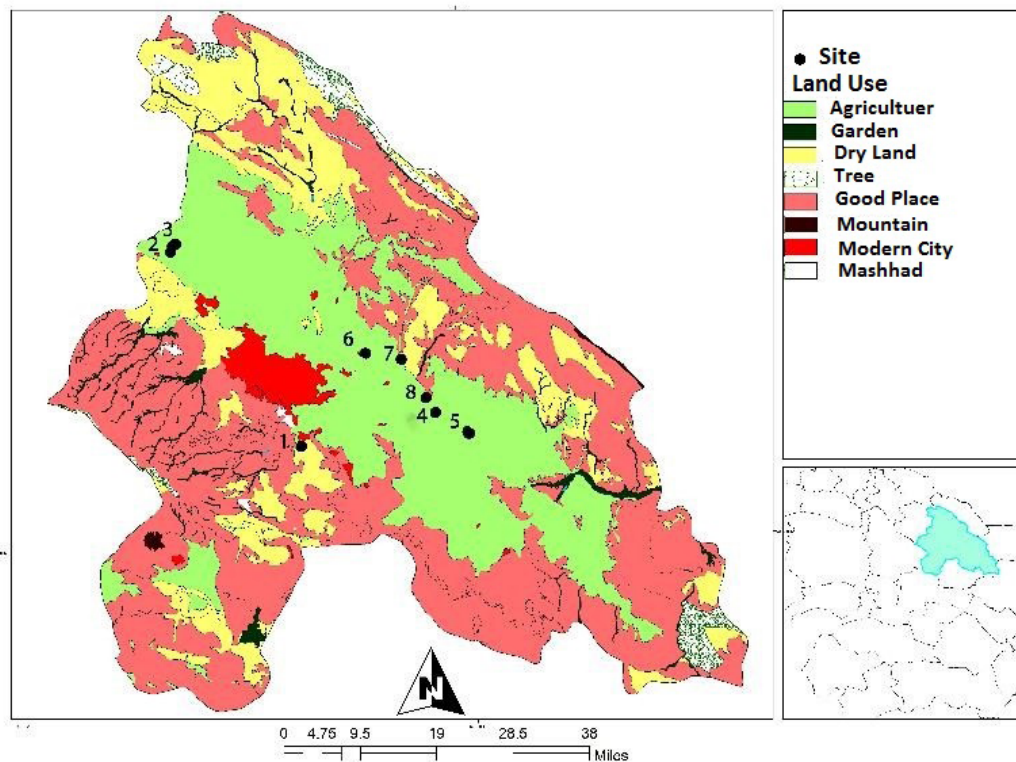


Figure 8: Distribution of the Iron Age settlements in the Mashhad plain by land use

The term “Yaz” designates a cultural and chronological horizon attested at a namesake site in the Merv oasis of Turkmenistan (Masson, 1986: 42). This culture is typified by handmade decorated pottery with crude geometrical motifs. In contrast to the Iron Age of Iran, it shares affinities with the previous period (Bronze Age) in technology and material culture (Khlopin, 1981: 46-49, Figure. 5-6). Chronologically, the Yaz culture is divided into three sub-periods of I to III. Yaz I is in parallel with the early Iron Age (1400–900 BCE), Yaz II date between 900-550 BCE), and Yaz III spans 550-300 BCE. The results of the excavation at Yaz reflect profound social changes and a wide range of social stratification. Half of the related settlements represent military fortresses built on a mud-brick platform with fortifications. The remaining half similarly rest on mud-brick platforms but lack fortifications. Their unrestricted part is located in the outer portion and there is a complete separation between main buildings and feudalism status (Seyed Sajadi, 2016: 94).

The defining characteristics of the Yaz culture include its handmade pottery and special settlement pattern (Kohl, 1984: 194). The use of Iron in the Yaz contexts has been reported (Askarov, 1992:

453). When the Dahistan culture was emerging in southwestern Central Asia, some different events were underway in the foothills of Kopet Dagh (Margiana). After 1000 BCE, all regions where the Namazgah VI culture was dominant became disintegrated after 3500 years of continuity (Seyed Sajadi, 2016: 94). Archaeological studies in northeastern Iran and Central Asia show a crisis in advanced urban settlements in 1700-1800 BCE, in a period known as the Late Bronze. Thus, some cities diminished in total area, some were abandoned, and new Iron Age cultures (Yaz and Dahistan) came to existence. Most of the contemporary settlements are adjacent to water resources and completely depended on water and animal husbandry for their subsistence (Vahdati, 2015). A similar situation prevailed in our study area. Here (southern foothills of Kopet Dag), two groups of Iron Age settlements are distinguishable: one consisting of those with deposits of earlier (late Bronze Age) occupations, and the other including the centers that were established in the Iron Age for the first time. Among the identified sites in the Kashafrod basin (Mashhad plain), eight sites contain Iron Age material cultures which show strong affinities with the Iron Age of Central Asia (Yaz culture) (Table 1).

There are two scholarly views on the possible reasons of this situation: One is an invasion from foreigners whose subsistence relied on animal husbandry and nomadism; the second is climatic changes that caused problems to subsistence and agricultural activities. Consequently, a nomadic and pastoralist subsistence system supplanted the earlier agricultural economy. Yet, results of the studies by Russian and Italian archaeologists contradict this hypothesis as they suggest that a fairly stable climate had prevailed in Iran and Central Asia for about 7000–8000 years. Khlopin and Khlopina have proposed an alternative hypothesis, which cites highly advanced cities and excessive use of economic and technical resources as the main reasons for the crisis. It impacted social and daily life and fair distribution of resources and products. This crisis pushed people to divide into small groups and migrate (Seyed Sajadi, 2016: 85-87). Archaeological finds indicate that most of the populations who left southern Turkmenistan moved to the eastern regions, where more water resources were available. The villages are concentrated in the Morghab Delta and also the midstream of the Oxus River. This observation hints at migrations that aimed for fresh water and food resources, providing a further support for Khlopin and Khlopina's hypothesis (Seyed Sajadi, 2016: 87).

To some scholars the archaeological work at the early Iron Age sites suggest that Central Asia consisted of two broad regions as was the case in the previous period. One region was settled by Steppe communities who subsisted on breeding domesticated animals, and the second was occupied by people acquainted with advanced farming methods that were prevalent in the East. The cultures of these regions had emerged unequally. Archaeological finds and data suggest that they maintained close contacts with each other, and exchanged their cultures and economic achievements. These cultural and ethnical ties contributed to the further advance of the early Iron Age societies. Achievements of both regions were undoubtedly inspired by the neighboring regions, which were in turn were inspired by these regions. All these contacts could have been either through peaceful, cultural and inter-tribal interactions or through invasion and domination (Askarov, 1992: 305-306).

## Conclusions

The identified Iron Age settlements in the Mashhad Plain are all homogenous with Yaz culture's characteristics, and their surface assemblages lack any affinities with the Dahistan culture. The Iron Age settlements in the midstream of the Kashafrud (Mashhad plain) are of two groups. One group contain pre-Iron Age, especially late Bronze Age, deposits in their archaeological sequences, while the second group is represented by settlements that emerged in the Iron Age. The first group lies at elevations above 1000 m and emerged immediately after the late Bronze Age. They had been probably affected by the crisis that stroke in the late Bronze Age, but survived through successful adaptation, and the Iron Age Yaz culture continued in them uninterruptedly. The turning point of these settlements is the evident drop in the Iron Age cultural materials compared to the other periods, a fact that suggests a decrease in population and size of settlements compared to the late Bronze Age, as is the case with Central Asia. Sites in the second group are located in elevations below 966 m in southeastern Mashhad plain. They are almost below 1 to 0.5 hectares in total area, possibly a sign of migration or settlement of small tribal groups after the advent of urbanism in the late Bronze and Iron periods. Further excavations at the involved sites are required before this hypothesis is verified. Both groups are clearly dispersed in a linear pattern, less than 500 m from the rivers and in the lands with agricultural use. This observation shows that the Iron Age settlements did not suffer from water shortage or other adverse environmental factors. The small size of the settlements of the second group, e.g. Tepe Helali with a total area of about 500 m, might relate them to a nomadic way of life relying on pastoralism and present them as seasonal settlements. Yet the biological factors of this group are suggestive of a sedentary lifestyle based on agriculture in the Iron Age. However, no material culture supporting this lifestyle has so far been reported from these settlements. Judging from the surface finds and the current state of our knowledge, the Mashhad plain in the Iron Age saw the rise of two discrete types of lifestyles, namely sedentism based on agriculture and nomadism based on animal husbandry, with cultural traditions distinct from the earlier periods in the wake of the late Bronze Age developments. The newly-emerged phenomena were perhaps the result of the collapse of the economic hierarchy (craftsmen, artisans,

farmers and other professional careers) and the advanced society of the late Bronze Age as part of the uncertain crisis in urbanism as a result of which groups inhabiting large cities began to disperse across the region and establish new settlements following their ancestral ways of life. On the other hand, the lack of sufficient specialization led them to produce crude products that shaped the cultural attributes of the Iron Age in northeastern Iran and Central Asia.

This merely represents a fresh proposal and hypothesis, and should be examined through excavations of reliable contexts in the Iron Age settlements and studying the homogenous materials of northeastern Iran and Central Asia. At any rate, the Kashafrud river as the vital artery of the middle Kashafrud basin (Mashhad plain) has furnished throughout the history a fertile ecosystem that has attracted human populations from prehistory up to the present.

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